

Written Exam for the M.Sc. in Economics Summer 2010

Advanced Development Economics: Micro Aspects

Final Exam

Date 31 May 2010

(3-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by “eksamen på dansk” in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students’ self-service system.

Question 1:

The questions below refer to the analysis and results in Duflo (2001), “Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment”, *American Economic Review*, 91(4), 795-813. Between 1973 and 1978, the Indonesian government engaged in one of the largest school construction programs on record. Duflo (2001) evaluate this effect of building schools on education and earnings in Indonesia.

(a) Using Table 3, outline the basic idea behind the identification strategy followed in Duflo (2001).

TABLE 3—MEANS OF EDUCATION AND LOG(WAGE) BY COHORT AND LEVEL OF PROGRAM CELLS

	Years of education			Log(wages)		
	Level of program in region of birth			Level of program in region of birth		
	High (1)	Low (2)	Difference (3)	High (4)	Low (5)	Difference (6)
<i>Panel A: Experiment of Interest</i>						
Aged 2 to 6 in 1974	8.49 (0.043)	9.76 (0.037)	-1.27 (0.057)	6.61 (0.0078)	6.73 (0.0064)	-0.12 (0.010)
Aged 12 to 17 in 1974	8.02 (0.053)	9.40 (0.042)	-1.39 (0.067)	6.87 (0.0085)	7.02 (0.0069)	-0.15 (0.011)
Difference	0.47 (0.070)	0.36 (0.038)	0.12 (0.089)	-0.26 (0.011)	-0.29 (0.0096)	0.026 (0.015)
<i>Panel B: Control Experiment</i>						
Aged 12 to 17 in 1974	8.02 (0.053)	9.40 (0.042)	-1.39 (0.067)	6.87 (0.0085)	7.02 (0.0069)	-0.15 (0.011)
Aged 18 to 24 in 1974	7.70 (0.059)	9.12 (0.044)	-1.42 (0.072)	6.92 (0.0097)	7.08 (0.0076)	-0.16 (0.012)
Difference	0.32 (0.080)	0.28 (0.061)	0.034 (0.098)	0.056 (0.013)	0.063 (0.010)	0.0070 (0.016)

Notes: The sample is made of the individuals who earn a wage. Standard errors are in parentheses.

(b) Using Table 4, discuss the problem omitted time- varying and region-specific effects and explain how Duflo (2001) can conclude that the estimates are not upwardly biased by mean reversion or omitted programs.

TABLE 4—EFFECT OF THE PROGRAM ON EDUCATION AND WAGES: COEFFICIENTS OF THE INTERACTIONS BETWEEN COHORT DUMMIES AND THE NUMBER OF SCHOOLS CONSTRUCTED PER 1,000 CHILDREN IN THE REGION OF BIRTH

	Observations	Dependent variable					
		Years of education			Log(hourly wage)		
		(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Experiment of Interest: Individuals Aged 2 to 6 or 12 to 17 in 1974</i>							
<i>(Youngest cohort: Individuals ages 2 to 6 in 1974)</i>							
Whole sample	78,470	0.124 (0.0250)	0.15 (0.0260)	0.188 (0.0289)			
Sample of wage earners	31,061	0.196 (0.0424)	0.199 (0.0429)	0.259 (0.0499)	0.0147 (0.00729)	0.0172 (0.00737)	0.0270 (0.00850)
<i>Panel B: Control Experiment: Individuals Aged 12 to 24 in 1974</i>							
<i>(Youngest cohort: Individuals ages 12 to 17 in 1974)</i>							
Whole sample	78,488	0.0093 (0.0260)	0.0176 (0.0271)	0.0075 (0.0297)			
Sample of wage earners	30,225	0.012 (0.0474)	0.024 (0.0481)	0.079 (0.0555)	0.0031 (0.00798)	0.00399 (0.00809)	0.0144 (0.00915)
<i>Control variables:</i>							
Year of birth*enrollment rate in 1971		No	Yes	Yes	No	Yes	Yes
Year of birth*water and sanitation program		No	No	Yes	No	No	Yes

Notes: All specifications include region of birth dummies, year of birth dummies, and interactions between the year of birth dummies and the number of children in the region of birth (in 1971). The number of observations listed applies to the specification in columns (1) and (4). Standard errors are in parentheses.

(c) Based on Figure 1 explain why the identification strategy in Duflo(2001) is considered reasonable.

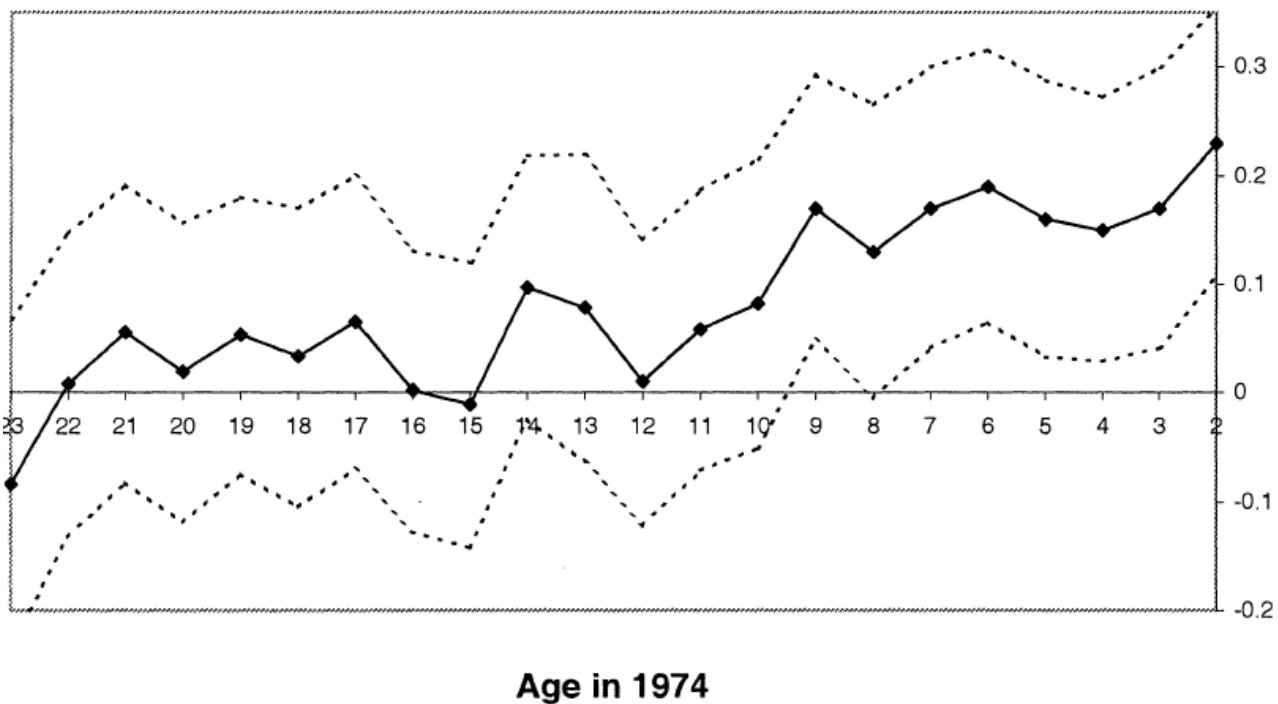


FIGURE 1. COEFFICIENTS OF THE INTERACTIONS AGE IN 1974* PROGRAM INTENSITY IN THE REGION OF BIRTH IN THE EDUCATION EQUATION

Question 2:

Consider a rural credit market where borrowers and lenders are risk neutral. Each individual in a village has access to the same amount of land, and can farm this land at a fixed cost (equal to 1). The farm yields 0 if there is harvest failure, and $R > 1$ otherwise. The probability of a successful farming season is $\pi(e)$, where e represents effort of the farmer. $\pi(e)$ is strictly increasing and concave. The utility cost to the farmer of working is given by $D(e)$, which is increasing and strictly convex. Assume no land market (no wealth), and the farmer therefore has to borrow the necessary working capital. If a lender offers an interest factor of $i \leq R$, the returns to the farmer and lender are as follows:

	Borrower	Lender
Success	$R - i - D(e)$	i
Failure	$D(e)$	0

Assume that lenders have access to a risk-free capital market with a return (ρ) of $R > \rho \geq 1$.

Assume also that, if the borrower does not involve herself in farming, she can receive a return (W) of $R > W \geq 0$ in alternative employment. Based on the above we have that;

The expected utility of a borrower: $U(i, e) = \pi(e)(R - i) - D(e)$

The expected utility of a lender: $\Pi(i, e) = \pi(e)i$

- (a) In compiling the above table two assumptions are made. Describe and discuss these assumptions.
- (b) Assume that a lender cannot observe the input of effort by the borrower. Describe in context of the above model setting the consequences of this moral hazard problem.
- (c) Explain and illustrate graphically how the equilibrium in (b) compares with the (i) Competitive equilibrium with complete markets, (ii) Equilibrium with a fully informed monopolist, and (iii) Equilibrium where there is competition between an informed local moneylender and uninformed outside lenders.
- (d) Outline an example of how the consequences of moral hazard can be neutralized.

Question 3:

Technological changes in developing countries are often characterized as a process where a given technology is invented in developed countries and then imported and adapted for local use. However, technological change is often more complex than transfers of blueprints and machines from rich countries.

- a) Explain why the value of international technology spillovers may be limited and define the concept of social learning.
- b) Describe the “Target Input” model of social learning and explain the testable implication of this model.
- c) According to the model, how may many expected neighbor technology adoptions affect own adoption?
- d) How is the relative usefulness of information gathered from own and neighbor technology experiments, respectively? Is this assumption plausible? How does unobserved farmer characteristics affect estimation of different types of learning? (Hint: Discussion of consistency versus efficiency).